

New Initiatives



Some of the many recreational uses of Long Island's Great South Bay. Under the water's surface, New York Sea Grant initiatives include hard clam research and brown tide research and education. Brown tide is one of several agents that has affected the bay in the last decade or so.

Photo by Barbara Branca

Three efforts are currently underway in which New York Sea Grant (NYSG) has been successful in bringing significant external financial resources to bear on critical and newly-developing environmental issues. "While each is in a different stage of implementation," explains NYSG Assistant Director **Cornelia Schlenk**, "the stories of their evolution serve to illustrate the groundwork, methods, and networks our program utilizes to make these new initiatives a reality." **Brown tide** efforts are now in their fifth year of special funding (see pages 6-7 for the latest findings), research selected under a **hard clam initiative** is in its first field season, and a **lobster mortality/shell disease program** has just started. "We have established an effective method in our approach and management of such initiatives that is becoming well-recognized as a successful model," says Schlenk. "These initiatives demonstrate that NYSG responds to emerging questions and stimulates others to do so as well."

Shoring Up Support for Hard Clams

Two Decades of Hard Clam Support

After funding a suite of milestone hard clam-related projects in the early 1980s, NYSG continued to support single projects as part of its core research program. In addition, the decline of the south shore's hard clam industry was one of the driving factors behind the creation of a state-supported effort similar to EPA's National Estuary Program. In 1993, the South Shore Estuary Reserve (SSER) was established to develop an overall, comprehensive management plan for the area, which included hard clam population maintenance. NYSG Assistant Director Cornelia Schlenk serves as chair of SSER's Technical Advisory Committee, as well as a member of its governing Council. Also, NYSG earmarked additional funds during 1998-1999 to support a pilot field study relating clam and oyster growth to phytoplankton composition and concentration.

Page 4 sidebar and article by Paul C. Focazio and Cornelia Schlenk

Hard clams— including such market sellers as chowders, cherrystones, and littlenecks (the smallest and most valuable of the bunch)— had been economic and ecological cornerstone of Long Island's South Shore Estuary area. Some 30 years ago, New York, with its Great South Bay considered "the world's richest clam factory," provided more than 60 percent of the nation's hard clams.

In 1976, landings of hard clams (*Mercenaria mercenaria*) hit an all-time record, totaling more than 700,000 bushels. But soon after, harvests started dropping. Around this time, hard clams first became an intensive topic of NYSG research and outreach. New York Sea Grant brought shellfish biologist **Robert Malouf** to New York on a Sea Grant professorship. During the 1980s, he, along with his colleagues and their many students, developed what Schlenk says "still stands as some of the best information we have about hard clam reproduction, predation, growth, and feeding."

To support its focus on the hard clam resource and industry, NYSG also funded and coordinated

a large set of studies of the Great South Bay in the early 1980s. These efforts culminated in, among other things, numerous journal articles and the production of the landmark *The Great South Bay* book. Landings continued to decline, however, and baymen gradually moved to other fisheries or left the water altogether.

While the 1980s' suite of NYSG-funded clam-related studies gave the industry and managers much-needed knowledge, continued declines in growth rate and recurring brown tides made it clear that a re-examination was essential. "A general assumption was that the hard clam's decline could be attributable to a number of factors, but some evidence suggested that the situation was changing further," says Schlenk.

Thanks to then-Congressman Mike Forbes' interest in the South Shore Estuary Reserve, in October 1999, NYSG announced that it would administer \$427,500 in funds from the Northeast Regional office of the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) for a new research initiative to investigate the population dynamics

www.seagrantsunysb.edu/HardClam/HardClamInitiative.htm

Lobster Mortalities and Shell Disease

In June 2001, the Long Island Sound Lobster Research Steering committee announced federal funding for 18 research projects that will improve what is known about the causes, extent, and persistence of conditions that led to die-offs and shell disease of the American lobster (*Homarus americanus*) in the Sound during 1999 and 2000. These research projects—most of which will start this summer and run two years—are jointly-funded under the \$3.5 million **Long Island Sound Lobster Initiative**, an endeavor of Sea Grant programs in New York and Connecticut along with the Connecticut Department of Environmental Protection (CT DEP).

Research will address the health and disease of lobsters and the influence of environmental stressors, including temperature and toxic contaminants such as pesticides on lobster mortality and shell disease. “This effort promises to be an excellent example of federal-state collaboration,” says Mattice. “The initiative’s research projects should provide evidence to select among the many potential causes of the lobster mortalities and sickness.”

Federal monies for the Sea Grant projects (six each by the NY and CT programs) are funneled to the Sea Grant

programs via National Marine Fisheries Service, which will conduct three projects of its own with the federal dollars. Connecticut Governor Rowland made \$1 million in funding available for three additional CT DEP projects. CT DEP and NYS DEC each are receiving 1.3 million federal dollars for monitoring in LIS. Other collaborators include representatives of Long Island Sound lobster fishers’ organizations and the US Environmental Protection Agency.



Both the New York and Connecticut Sea Grant programs will use some of the lobster allocation to keep the lobster fishers, resource managers and the public informed about how the research is progressing. “Research is a dynamic and collaborative effort,” says

NYSG lobster outreach specialist **Antoinette Clemetson**, “and the program’s success depends on the lobster fishing community’s willingness to cooperate with our scientists and vice-versa.” Clemetson’s role will be to keep the lines of communication open between the scientists and the stakeholders through a series of newsletter updates, workshops and other outreach techniques coordinated with Connecticut Sea Grant.

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This enameled metal lobster sculpture, on display in Southampton this spring, was done by student Greg Lesiewicz, son of a long-time Long Island lobsterman.

of hard clams in Long Island’s south shore estuary. “This targeted allocation of federal dollars for hard clam research could not have come at a better time,” says Schlenk. In December 1999, \$50,000 was added to the initiative’s pot for research by the Port Authority of New York and New Jersey, which was also supporting a hard clam stock assessment on the New Jersey side of Raritan Bay (part of the lower New York Harbor). New York Sea Grant contributed an additional \$100,000 and \$50,000 is anticipated for the SSER.

Three research teams, two of which are led by investigators from outside New York, have recently begun two-year projects.

Roger Newell of the University of Maryland Horn Point Lab has teamed up with Southampton College’s **Stephen Tettelbach** in an effort to determine if reproductive cycles of adult hard clams in Long Island’s south shore bays are still synchronized to normal patterns of primary production. If conditions are shown not to be optimal, the use of hatchery seed-clam production for restocking the bays may be advised as a short- to medium-term management strategy.

A research team at Stony Brook University—including **Robert Cerrato, Glen Lopez, Darcy Lonsdale, Roger Flood, Robert Armstrong** and **Jeffrey Levinton**—will examine the trophic interaction between hard clams and phytoplankton. In effect, the team is testing the idea that that “the reduction in clam abundance may have propelled its population and associated ecosystem into a state where the scope for its growth has been reduced.” Further, the clam’s steady declines in abundance in different habitats suggest one or more widespread or chronic causes.

Identifying the controlling factors related to hard clam growth, survival and environmental interactions will be the goal of the third and final research endeavor, to be headed by **Eileen Hoffman** of the Center for Coastal Physical Oceanography at Old Dominion University, Norfolk, Virginia. The multi-institutional team’s project summary states, “The primary objective of this effort is to develop a population growth model for the hard clam. This model will permit evaluation of the potential effects of changes in biological and environmental components of the Great South Bay system on the resident hard clam population levels and production.”

Lobster Mortalities continued from page 5:

Summary of NYSG-funded Lobster Projects

LIS Lobster Initiative

"The research topics highlighted in our request for proposals are a direct result of the year 2000 meetings," says NYSG Director Jack Mattice. In April 2000, over 250 lobstermen, researchers, resource managers, legislators of federal and state agencies as well as environmental organizations came together for the first annual LIS Lobster Health Symposium in Stamford, Connecticut.

The gathering in Connecticut – which featured experts who discussed some of the then-current hypotheses to explain the lobster die-off in the Sound – was succeeded by May 2000's "Lobsters and the Long Island Sound: 1999-2000." This meeting, at Stony Brook University, gave researchers and administrators an opportunity to discuss with lobstermen the research priorities that came from April's symposium.

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Robert E. Wilson, R. Lawrence Swanson and Duane E. Waliser, of Stony Brook University's Marine Science Research Center (MSRC), will examine influence of water quality factors such as temperature, salinity, dissolved oxygen, and pollutants with respect to the lobster mortalities. Says Wilson of the generally hardy American lobster, "The lobsters are vulnerable to stress and sometimes mortality when exposed to unfavorable environmental conditions, especially during the molt cycle. Environmental factors can act singularly or in combination to cause sub-lethal stress that increases sensitivity to events that would normally be tolerated. Significantly elevated bottom temperatures during the summer and fall of 1999 lead us to focus primarily on co-variations in temperature and dissolved oxygen."

Glenn Lopez and Robert Cerrato, also of MSRC Stony Brook, will find out to what extent high summer temperatures in Long Island Sound's bottom waters have negative impacts on lobsters and if larger lobsters are more susceptible to temperature stress than smaller ones. The results of their lab studies may be used to predict the effects of long term changes in summer temperatures on the health of the LIS lobster population. The study will shed light on normal patterns of lobster stress and mortality as well as the extraordinary mortality event of fall 1999.

Anne McElroy and Bruce Brownawell, of SBU's MSRC will address the potential link between pesticide use and lobster mortality. They will measure mortality and immune response in larval and juvenile lobsters exposed to environmentally realistic levels of pesticides (Malathion, Methoprene, and selected pyrethroids such as Anvil and Scourge). The team will also develop ways to measure levels of these pesticides and their breakdown products in

seawater, sediment, and possibly lobster tissues. They are particularly interested in sampling water after storm events when concentrations may be highest. "The results of this study should provide a strong indication whether or not pesticide use is likely to contribute to degraded lobster health in Long Island Sound," states McElroy. The study will also shed light on the effects of temperature on the immune response of young lobsters.

SUNY Purchase's **Jan Factor** will look at how lobsters defend themselves against infection and disease. He will develop methods that will allow the assessment of cellular defenses against infection and disease after sub-lethal exposure to environmental stresses and toxic substances. Says Factor, "Our research may lead to an explanation of the recent mortalities by enabling assessment of impacts on the immune system that may lead to lethal infections."

At the Chesapeake Biological Laboratory, **Robert S. Anderson** of the University of Maryland Center for Environmental Sciences will use cutting-edge biotechnology to measure the blood cell-related defense system of the lobster against disease. "This research will lay the groundwork for discerning changes in immune response due to toxicity or other environmental stressors," explains Anderson.

By comparing shell disease in lobsters from eastern Long Island Sound with those from Buzzards Bay, Massachusetts, **Andrei Chistoserdov** (MSRC) and **Roxanna Smolowitz** (Marine Biological Laboratory, Woods Hole) will identify the kinds of bacteria that cause lobster shell disease. The team will also design a set of specific probes that will be used to test for such pathogens.

<www. seagrant.sunysb.edu/LILobsters/LILobsters.htm>

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~~Currents) and more recently at the Northeast Recreational Research Symposium. In addition to publishing the symposium proceedings, NYSG hosts workshops and assists state agencies and stakeholders who can directly implement the study's recommendations.~~

~~While Todd's research has been a socio-economic survey, New York Sea Grant has also sponsored numerous research projects on the science of diving. At the State University of New York at Buffalo, investigators **Gerald Logue** and **Claes E. Lundgren** worked to define the role of a diver's age and the tendency to develop decompression sickness. Their~~

~~results showed that the rate of nitrogen elimination does not appear to play a role in the susceptibility of older persons to decompression sickness as had been hypothesized. However, there is a correlation between a diver's plasma triglycerides and a tendency to form bubbles with decompression. Lundgren's seminal work on decompression sickness and breath-hold diving is highlighted in CoastWatch on page 8 of this issue.~~

~~—**Barbara A. Branca, Jay Tanski and Dave White**~~